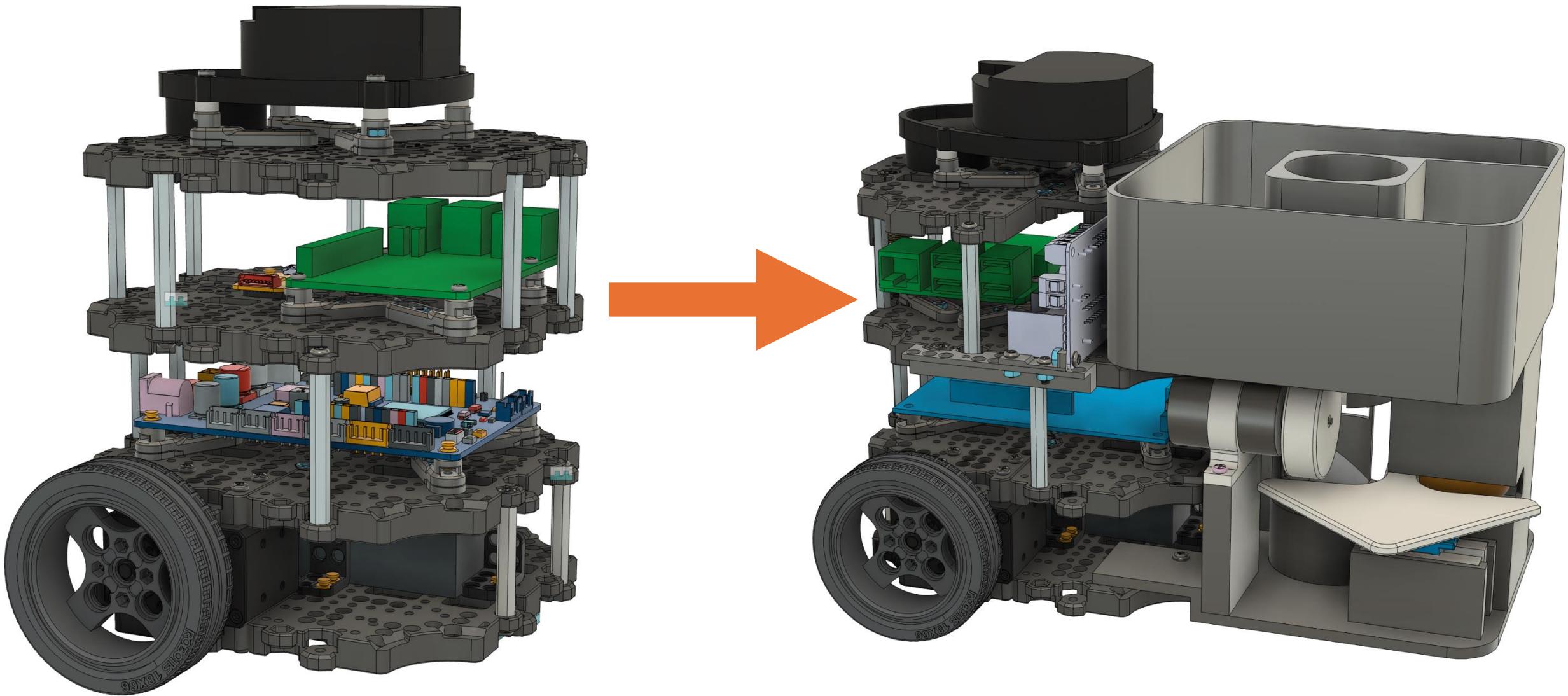
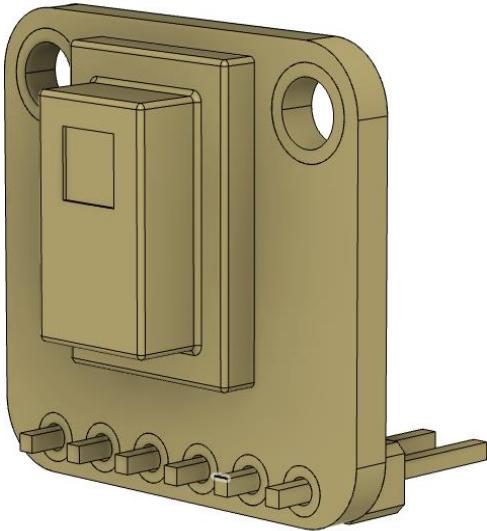


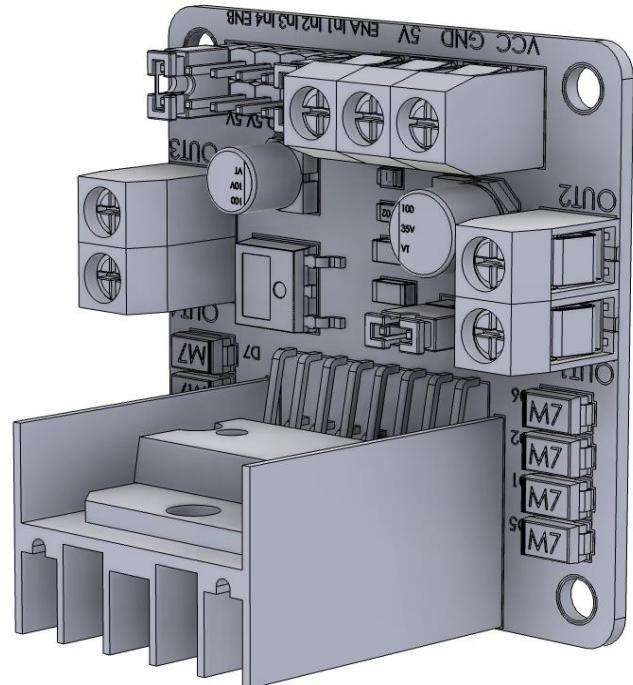
# Guide to upgrade Turtlebot3 to meet mission objectives



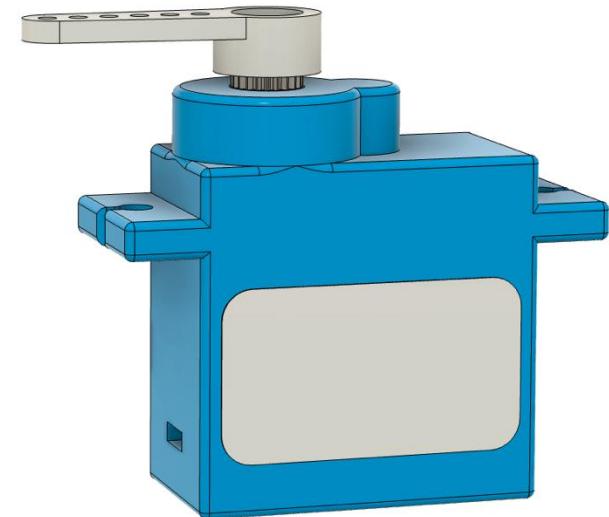
# Parts to Request from Lab



AMG8833



L298N



180 Servo

# Parts to Buy



12V Motor



Black Gasket Maker  
(Silicone)

# Fabrication

# Parts to Fabricate (3D Printed)

## PLA or PETG:

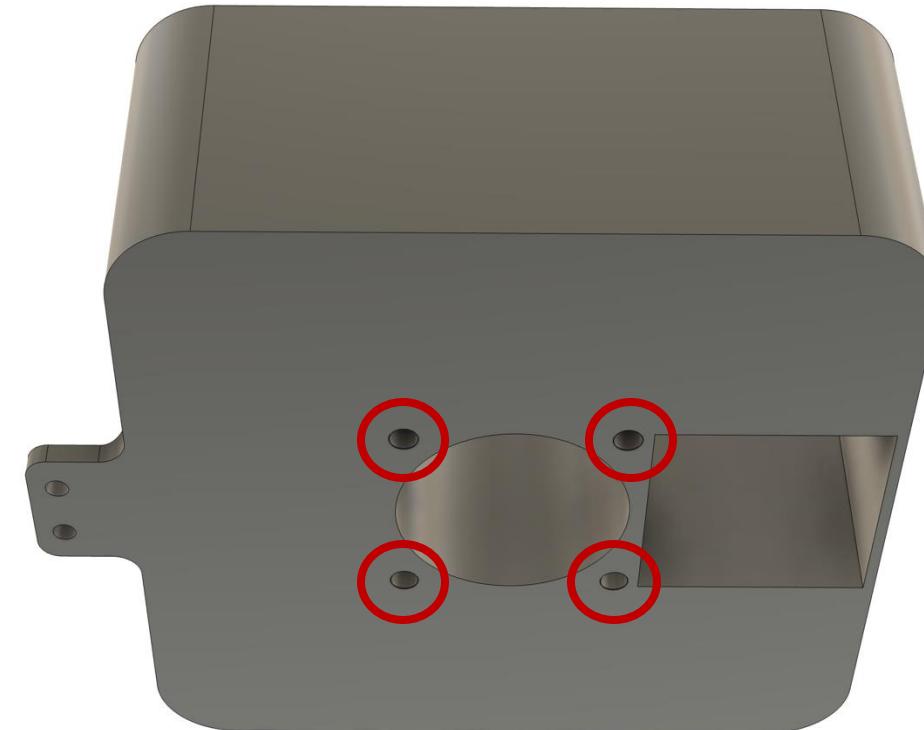
- Hopper
- Launcher Base
- AMG8833 Holder
- Modified Waffle Plate for LDS
- Modified Waffle Plate for L298N
- L298N Holder

## TPU:

- Ball Feeder
- Fly Wheel x2
- Motor Holder x2
- Servo Adapter

Recommended  
Material: PETG

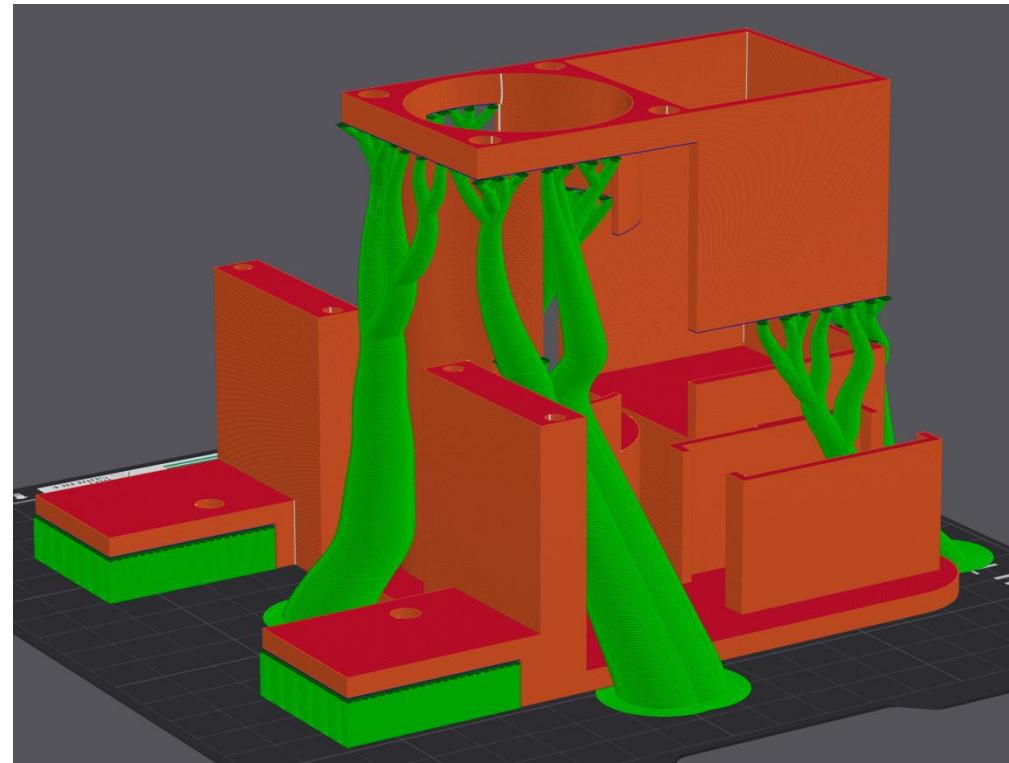
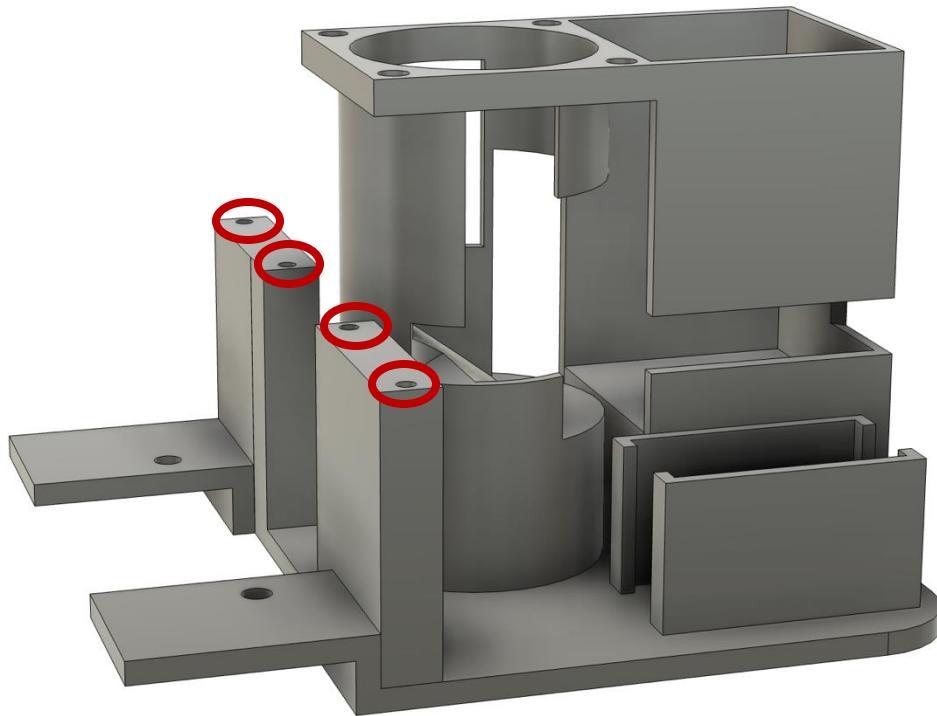
# Hopper (Launcher Top Half)



M3x8x5 Heat Inserts to be  
inserted into circled holes

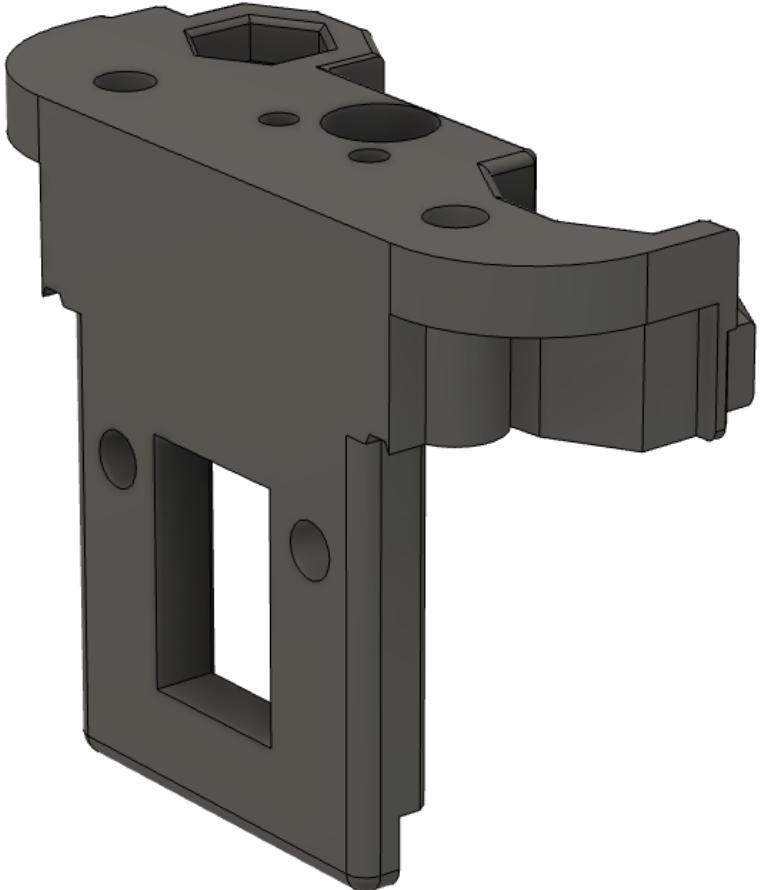
Recommended  
Material: PETG

# Launcher Base (Launcher Bottom Half)

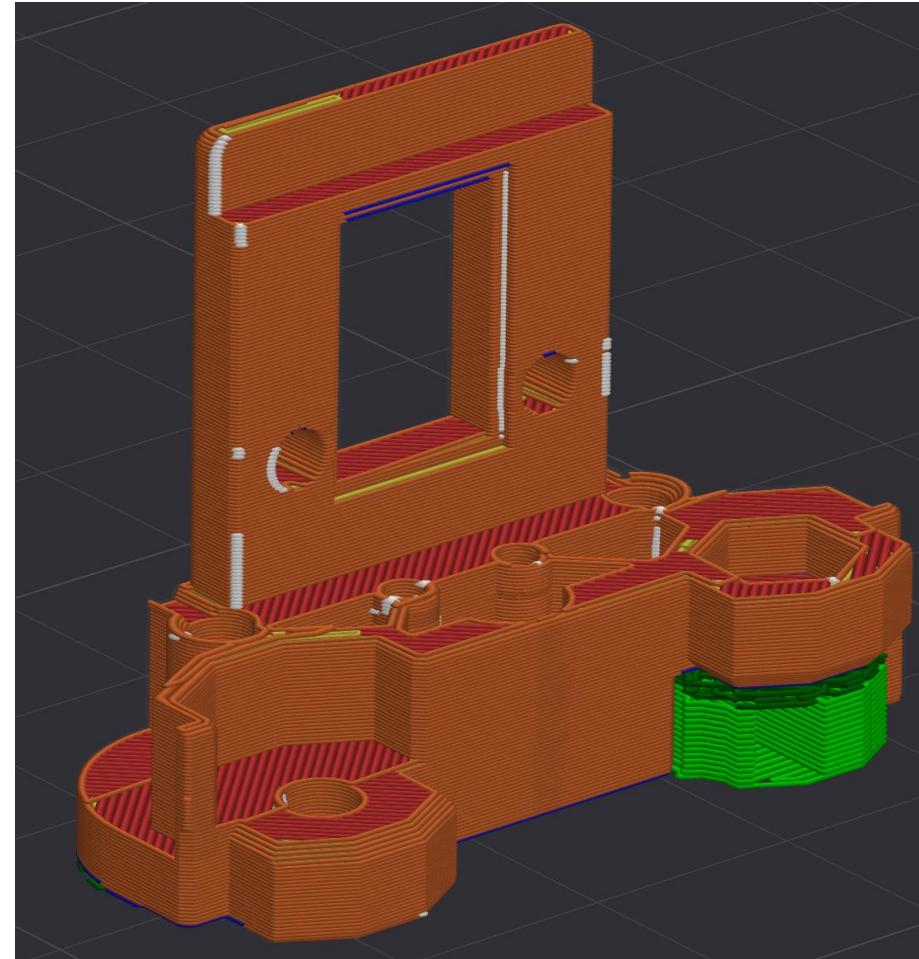


Supports required. Hybrid Tree recommended for quality and ease of removal. Heat Inserts recommended but not necessary

# AMG8833 Holder



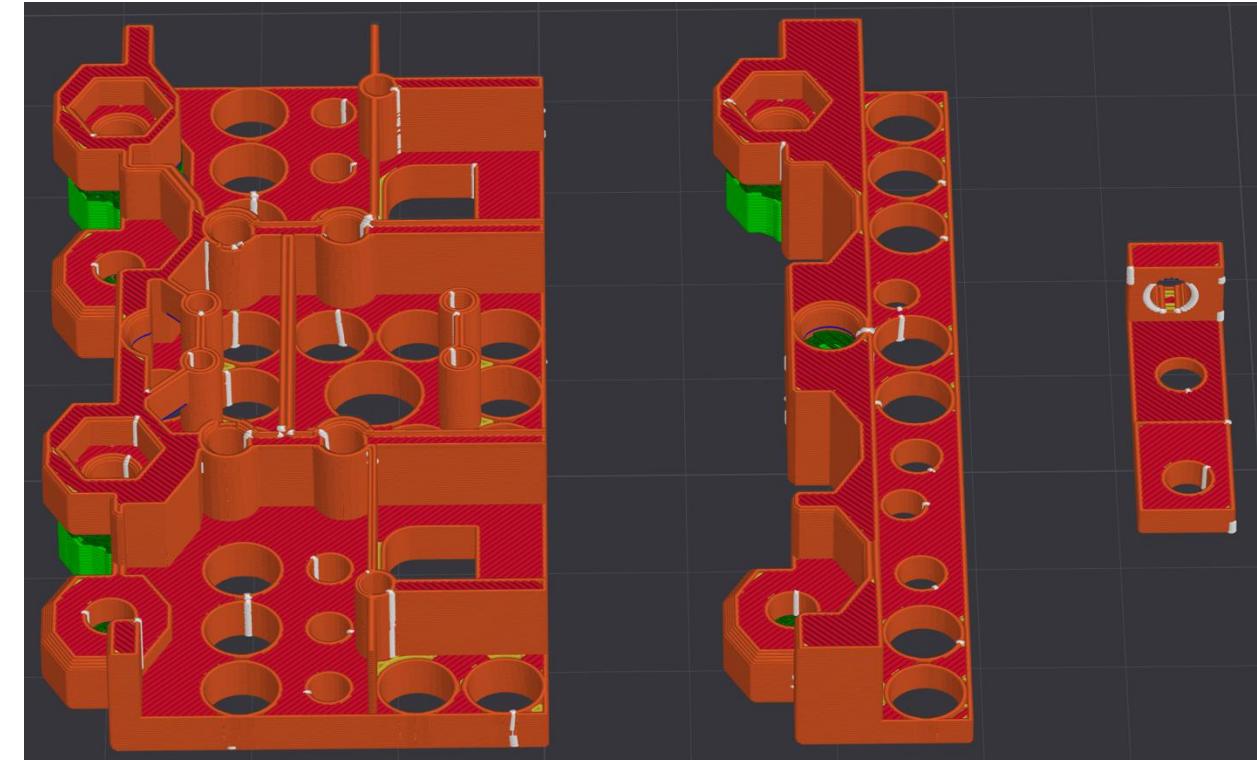
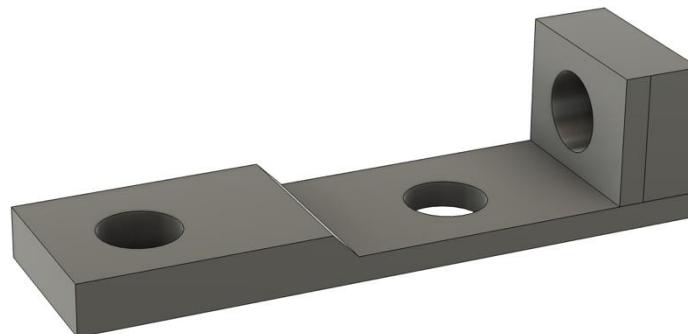
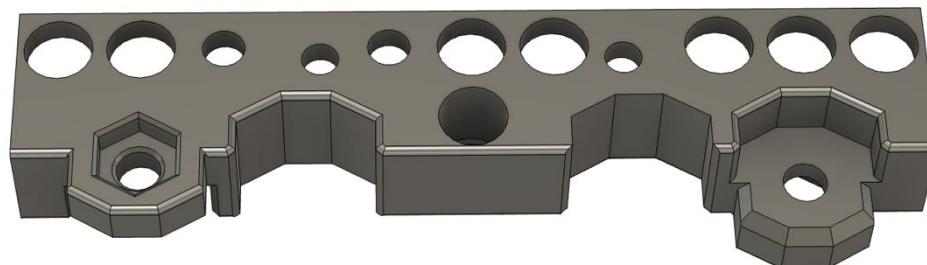
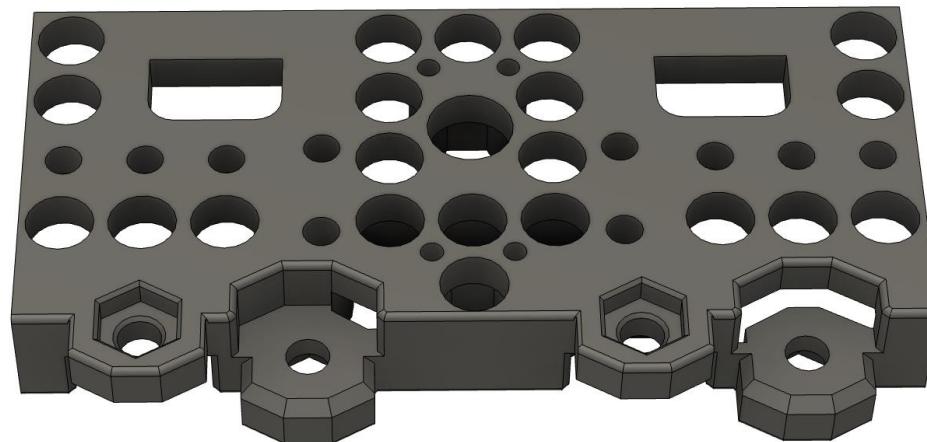
Recommended  
Material: PETG



Recommended print orientation  
shown above. Support for  
bridge not required.

Recommended  
Material: PETG

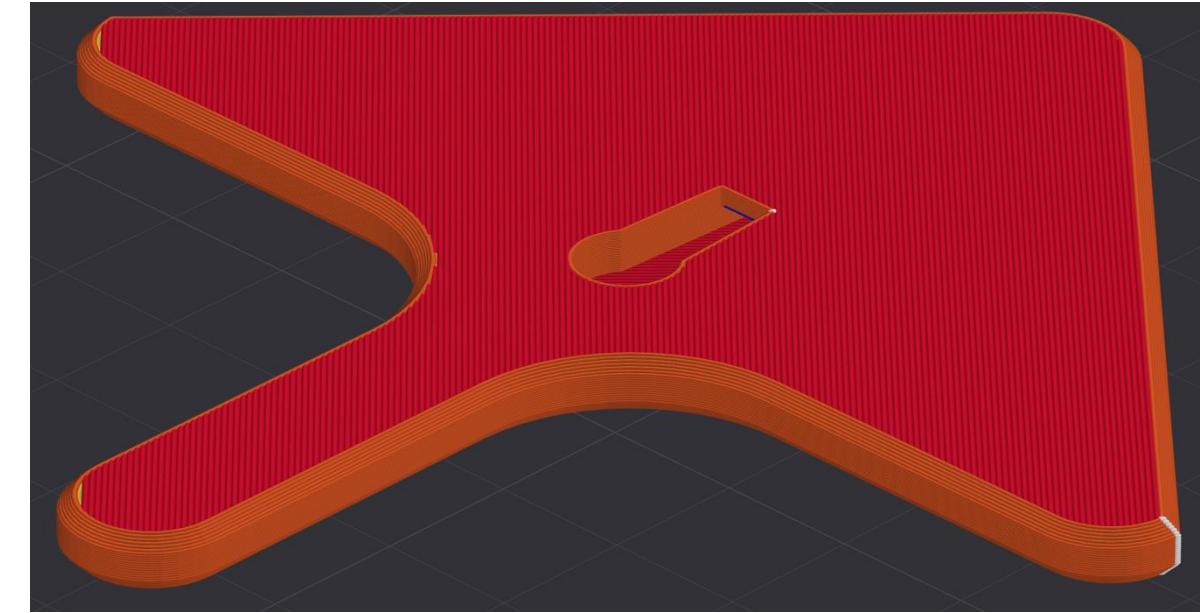
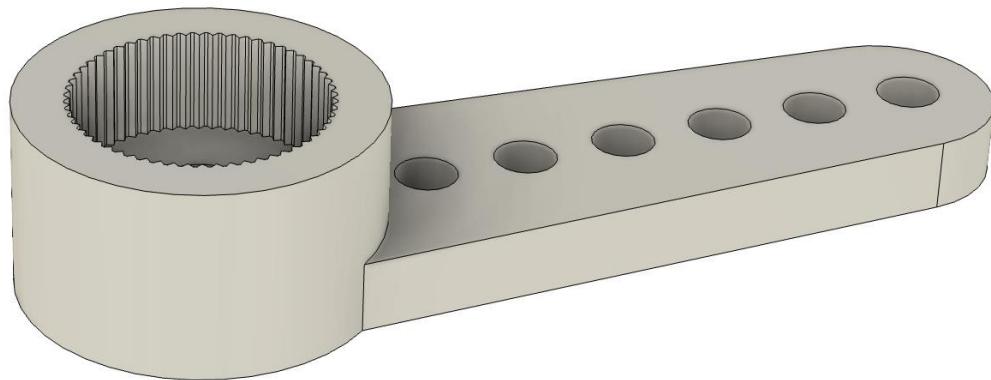
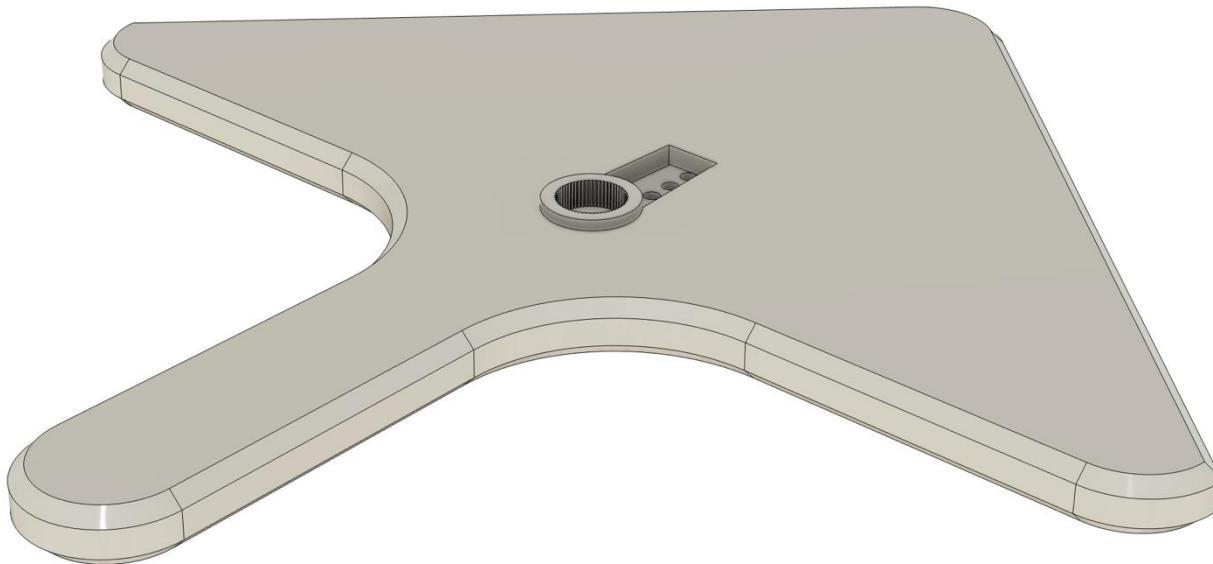
# Modified Waffle Plates & L298N Holder



Recommended print  
orientation shown above

Recommended  
Material: TPU

# Ball Feeder



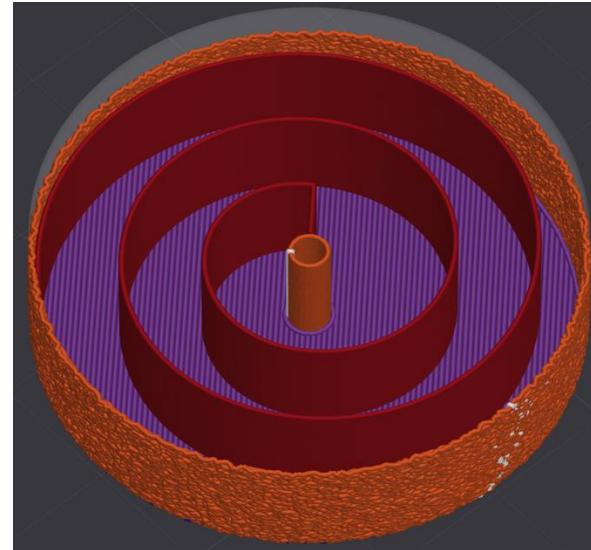
TPU makes the part bendable  
allowing for the servo arm to be  
installed/removed at will.

Recommended  
Material: TPU

# Fly Wheel x2



TPU is essential for the wheel to fit snugly on the motor shaft



Print with single wall and Archimedean Chord infill to achieve “squishy” property needed for fly wheel



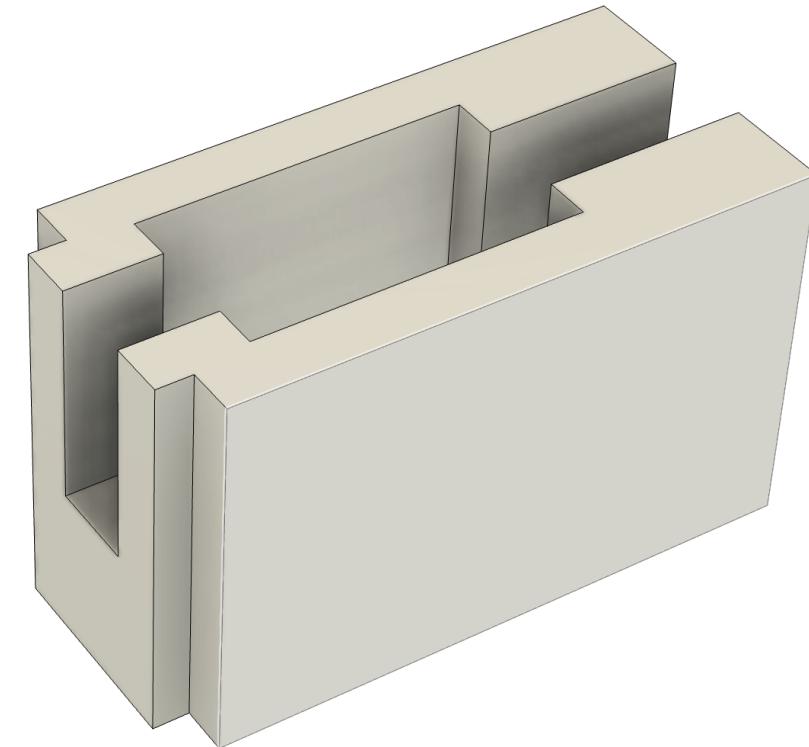
Apply at least 2 layers of black gasket to improve grip. Fuzzy skin allows the gasket to adhere better

Recommended  
Material: TPU

# Motor Holder x2, Servo Adapter

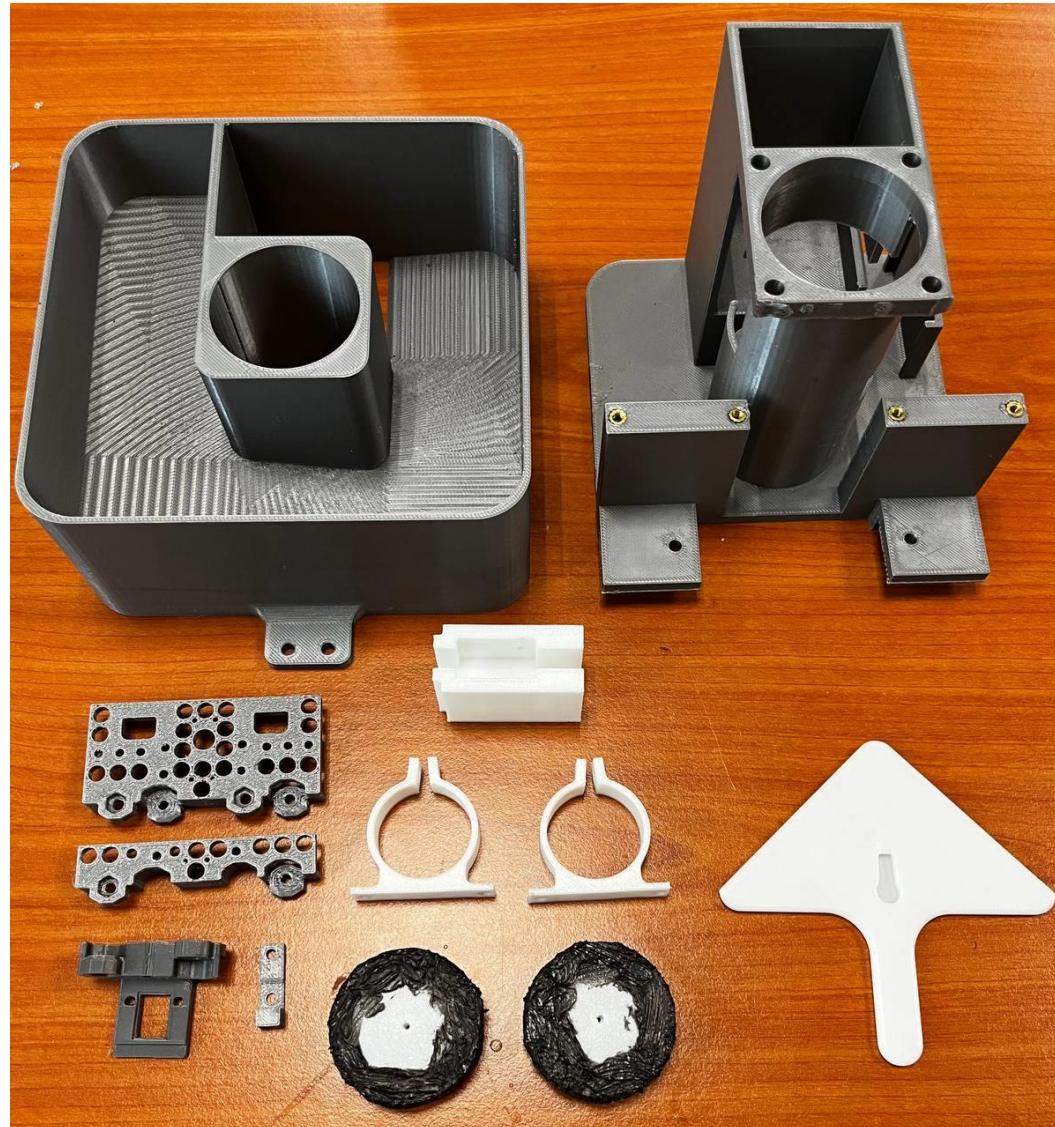


Motor secured within  
the holder using an M3  
Screw and Nut. TPU  
allows the holder to  
clamp down the motor



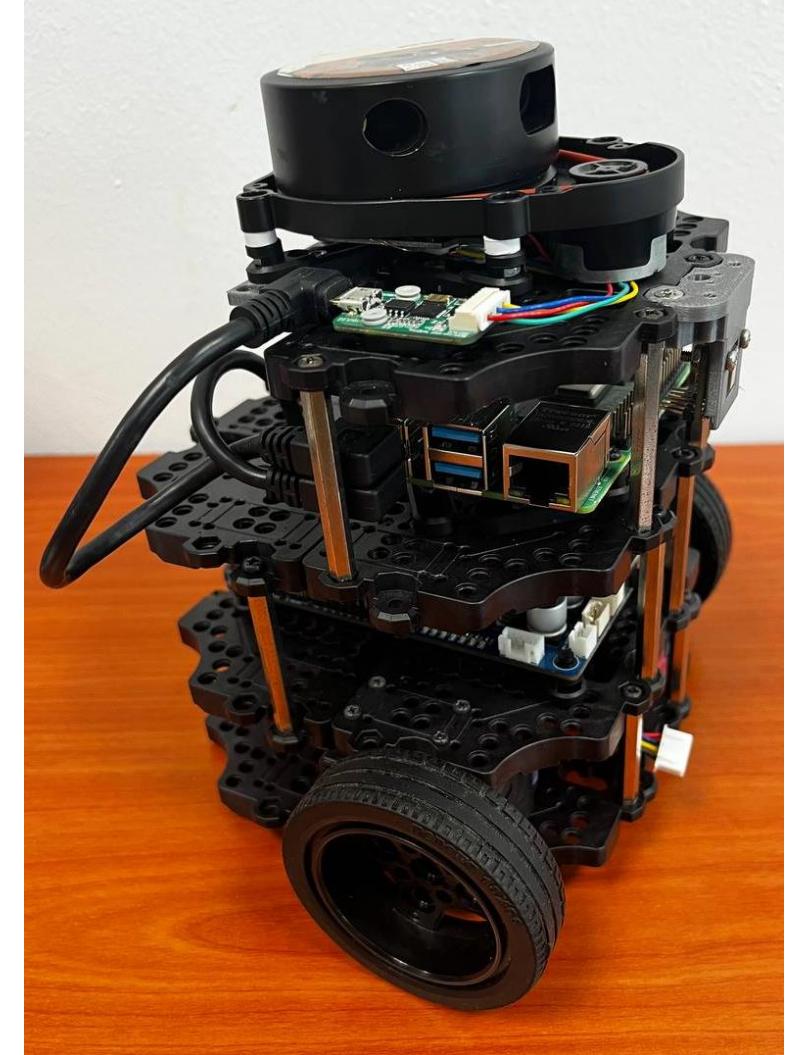
This adapter raises the  
servo to its intended  
position while the TPU  
keeps the servo secure by  
dampening vibrations

# Fabrication Summary

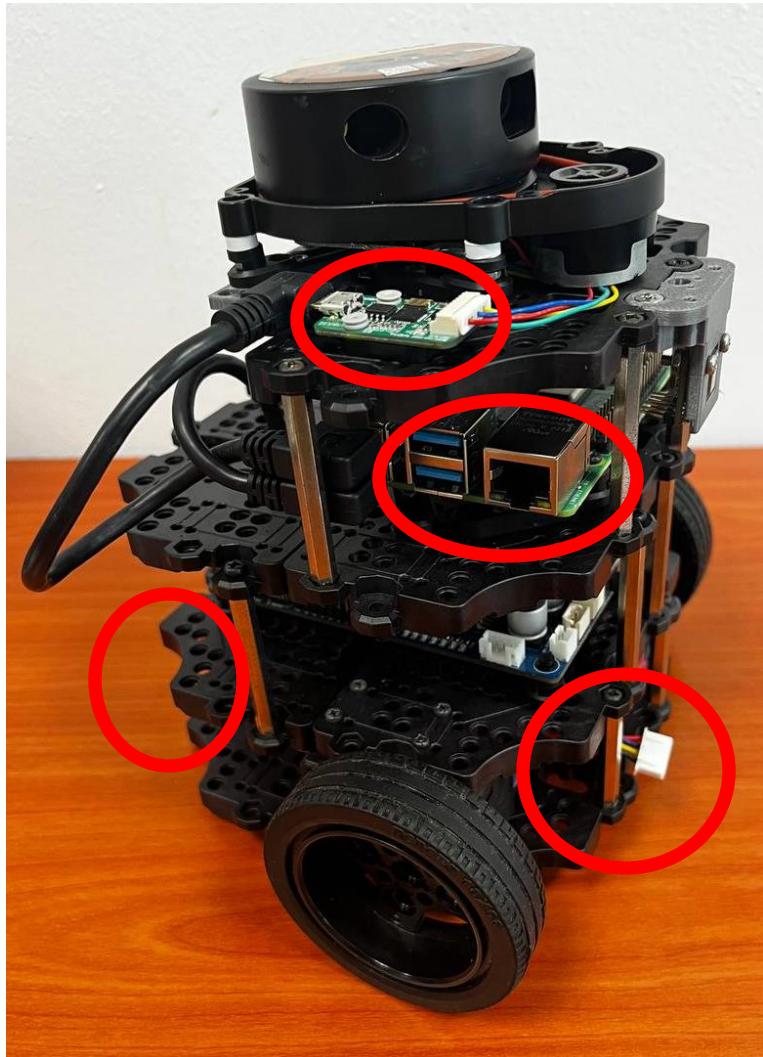


# Assembly

# Stage 1: Main Body



# Stage 1: Main Body



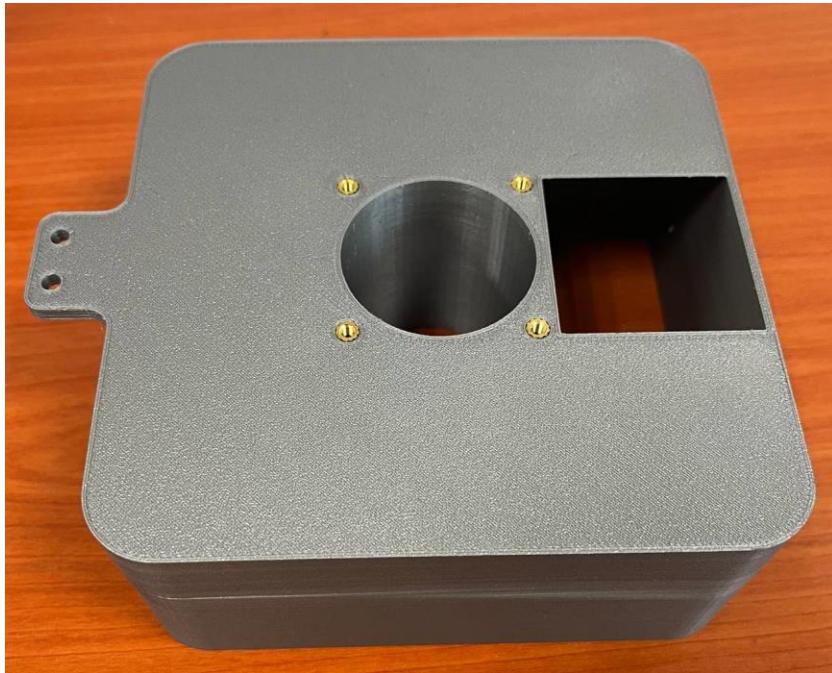
- Turn Battery 180 degree so that charging connection sticks out front
- Shift RPI onto other side of waffle plate and USB2LDS to Layer 4
- Remove Ball Caster

# Stage 1: Main Body

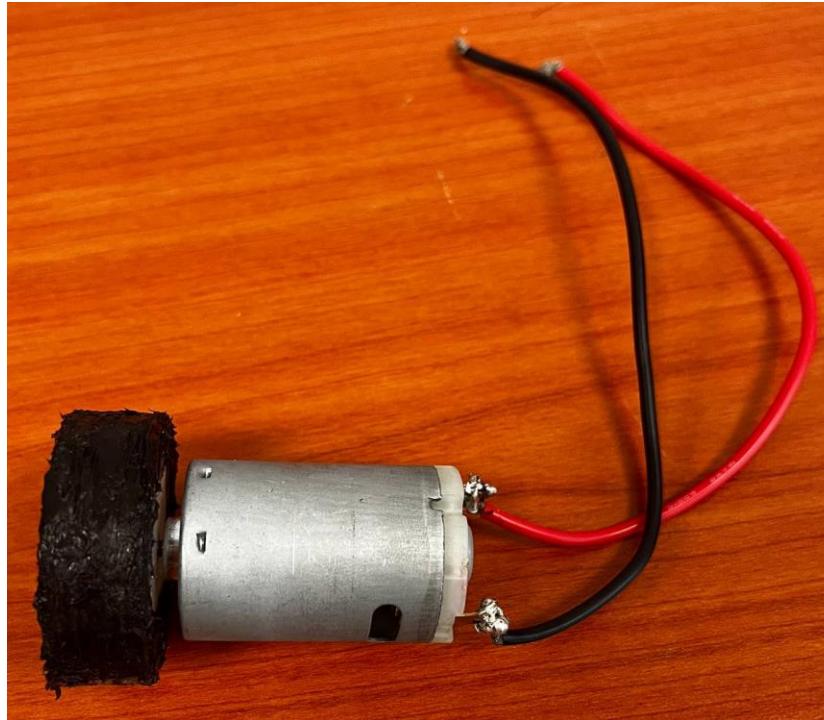


- Replace Layer 4's back waffle plate with Modified Waffle Plate
- Attach AMG8833 onto Layer 4 using AMG8833 mount
- Attach L298N Holder to Modified Waffle Plate and secure onto Layer 3
- Shift Plate Support back

# Stage 2: Launching Mechanism



Add in  
Heat Inserts

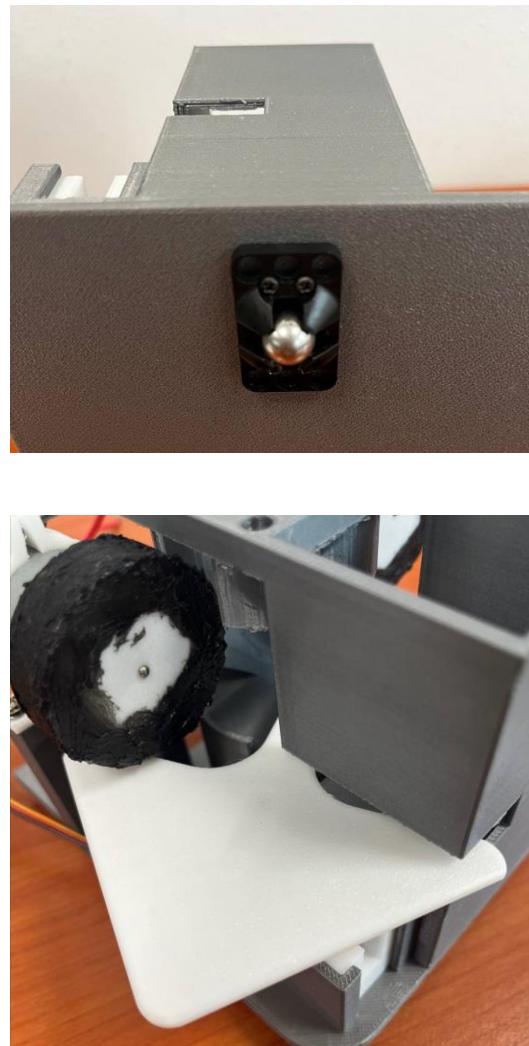
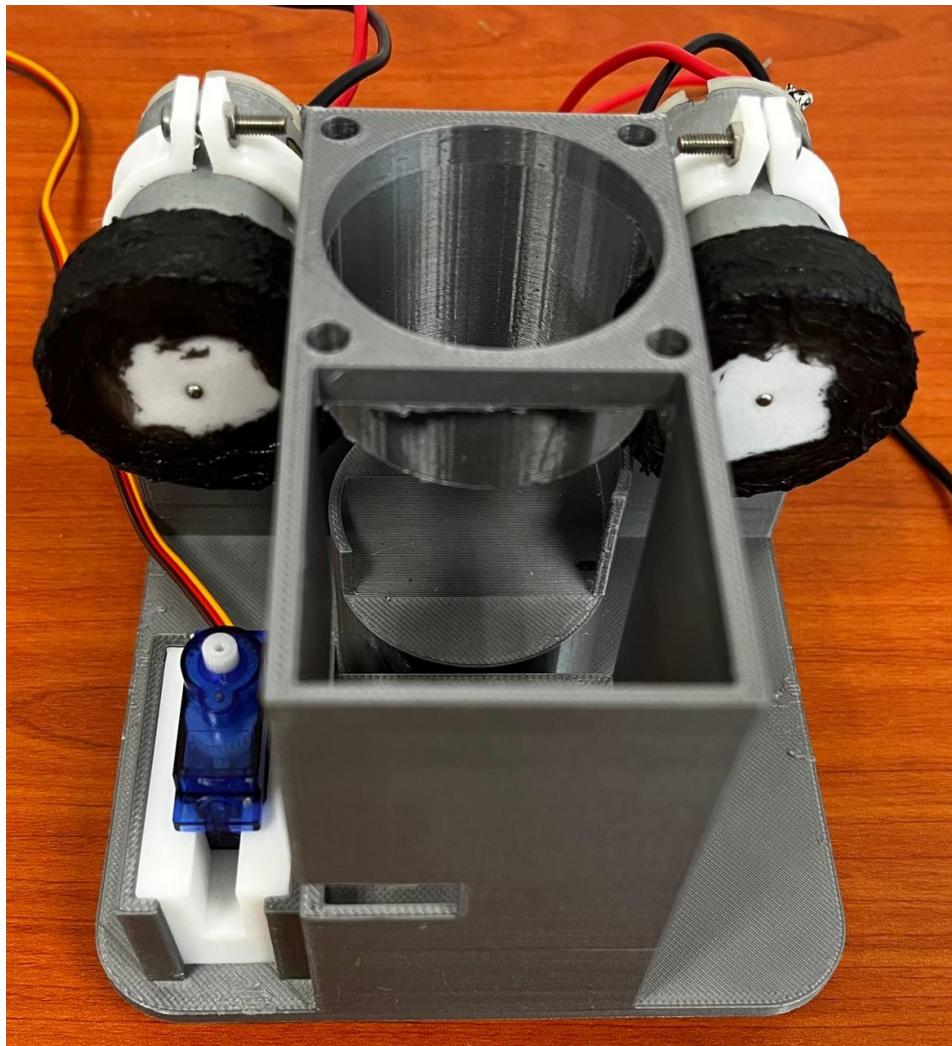


Solder wires onto motor  
and attach flywheel  
(silicone applied)



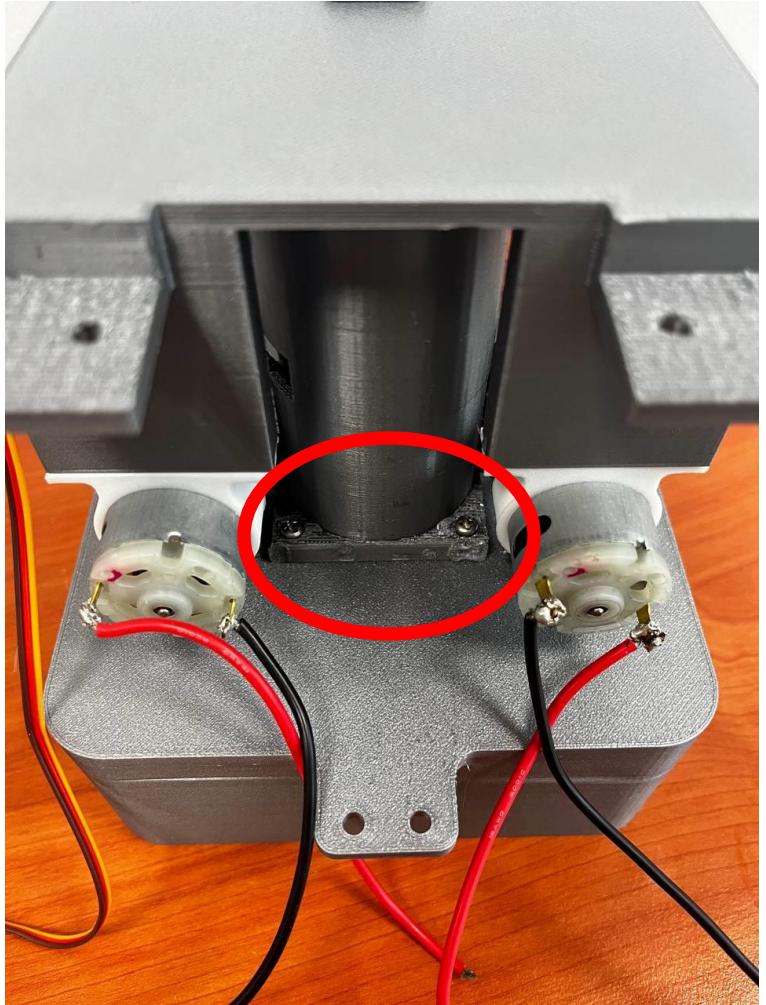
Attach  
Motor Holders

# Stage 2: Launching Mechanism



- Secure Motor and slot in servo (M3 Nut & Screw)
- Attach Ball Caster to base
- Attach Ball Feeder (adjustable during testing)

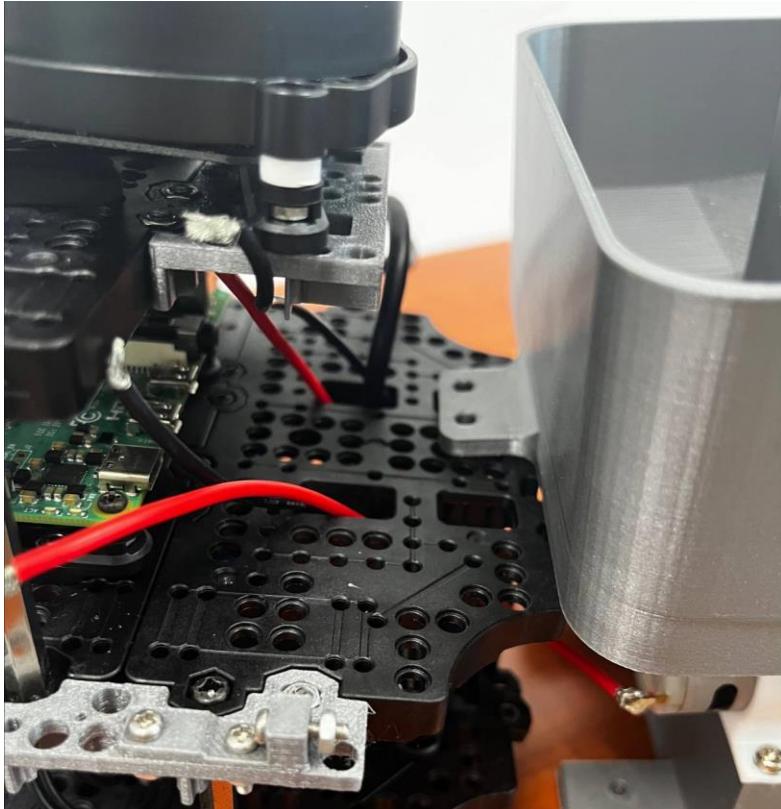
# Stage 2: Launching Mechanism



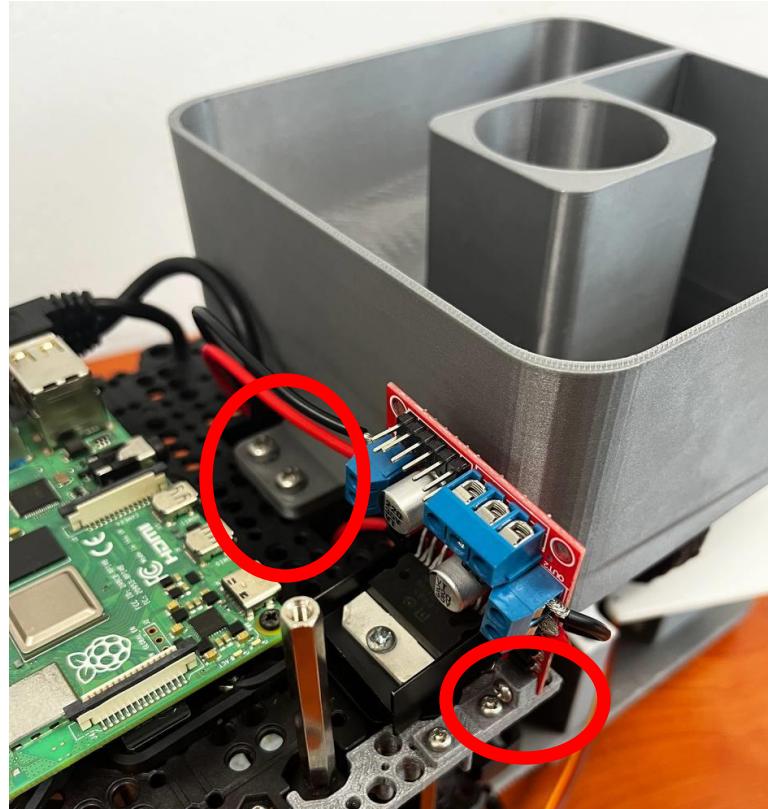
Secure Top  
Half to Bottom  
Half with 4 M3  
Screw



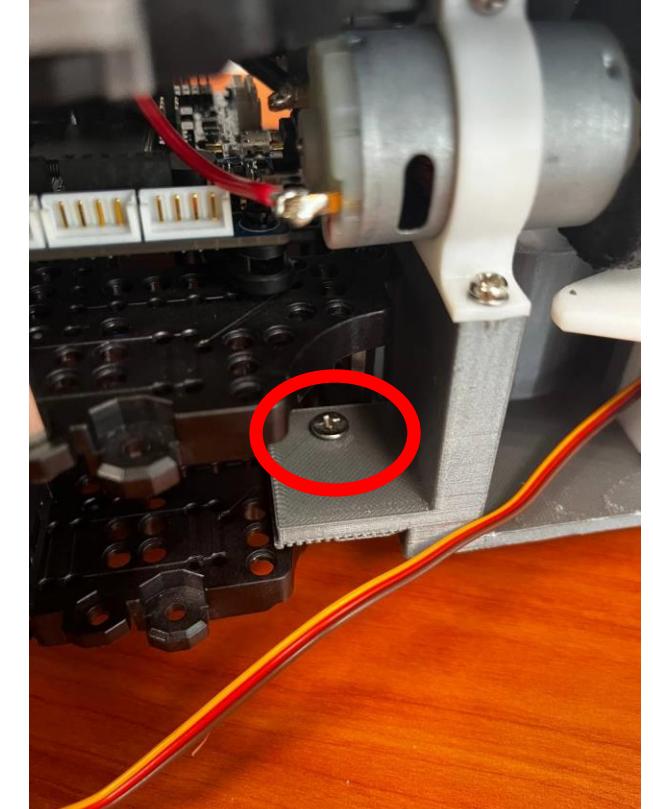
# Stage 3: Full Assembly



Feed Motor wires  
through holes as shown  
(Consider temporary  
detachment of Layer 4)

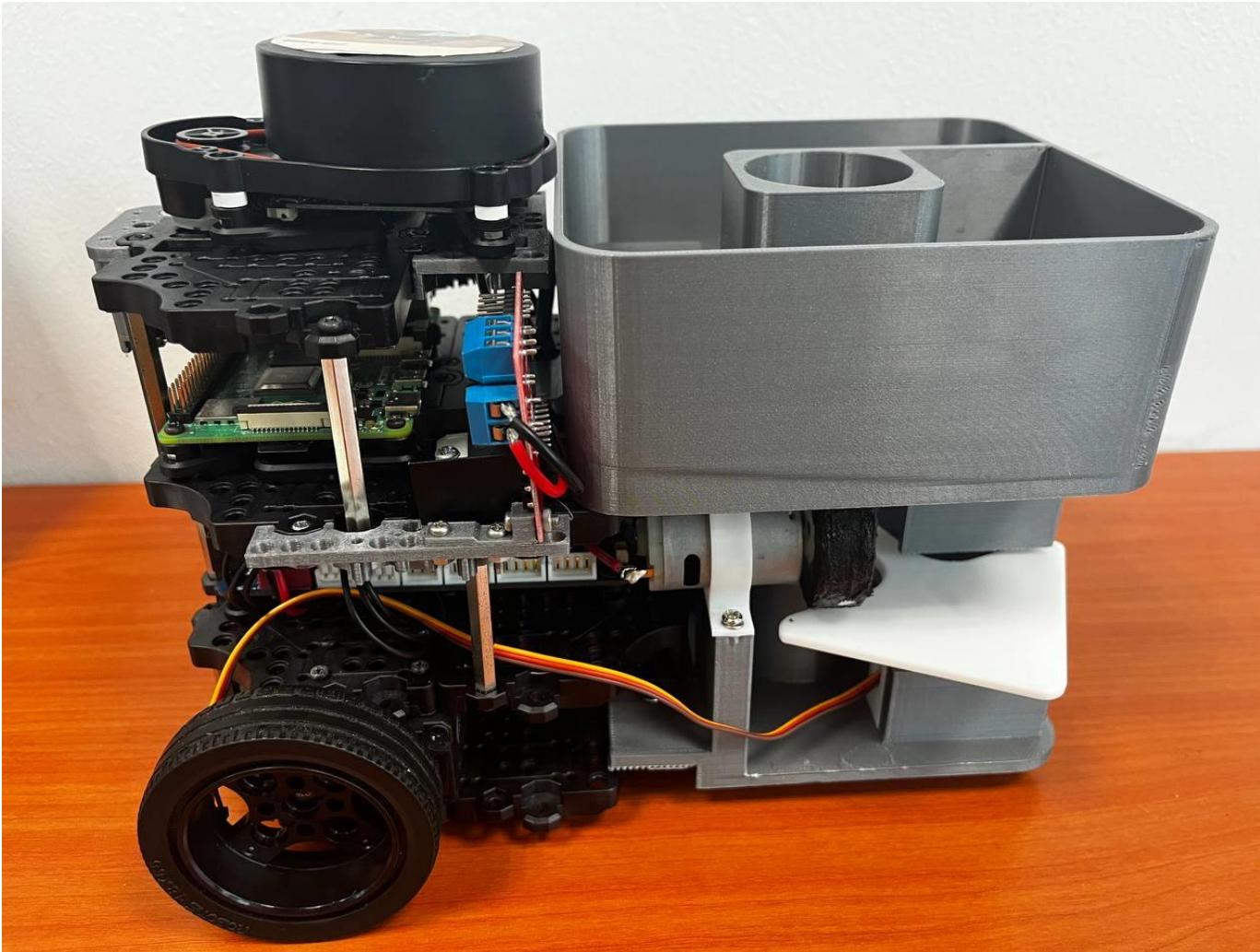


Secure L298N and  
Attach launcher using 2  
M4 Screws and Nuts



2 more M4  
screws and Nuts  
below

# Assembly Completed



# Annex

